Wireless Innovation Issues in Dockets:

09-157 (Wireless Innovation)
13-249 (AM Revitalization)
13-259 (IEEE-USA/§7/95+ GHz)

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Update

- Received 2013 IEEE Communications Society Award for Public Service in the Field of Telecommunications "For pioneering spectrum policy initiatives that created modern unlicensed spectrum bands for applications that have changed our world."
- http://www.comsoc.org/about/memberprograms/comsoc-awards/telecom/bios#Marcus
- Previous recipients include Commissioners Fogarty and Hooks

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3 Dockets

- All 3 have common issues of how FCC deals with innovative wireless technologies and how that impacts capital formation in those technologies
  - MSS has filed comments in all 3
- There are many things VCs can invest in today
  - Regulatory uncertainties of Title III technical rulemakings can be the "straw that broke the camel's back" to deter investment for new tech

Some Quotes

- “(W)e are aware that Commission policies and processes can also hinder the progress of innovation and investment. At times, we have seen innovators subjected to lengthy regulatory processes - such as debates over what constitutes harmful interference or how to fit a new spectrum use within our framework of rules - that can be an obstacle to progress in the wireless arena.” Docket 09-157 NOI

- "Going forward we continue to strive to foster an environment of innovation and investment. Our actions further three policy priorities: freeing additional spectrum, removing barriers to infrastructure deployment, and promoting robust competition.

  "Across each of these priorities, we are pursuing innovative policy approaches, necessitated in part by the growing complexity of the wireless broadband environment." – Ruth Milkman

http://www.fcc.gov/document/wtb-chief-ruth-milkman-remarks-georgetown-spectrum-policy-workshop

- ""As the expert agency on communications, it is the FCC's role to examine how we regulate the industry, and address unnecessary regulations when possible. In this case we have an outdated rule on our books that has been overtaken by advances in technology. If the technological justification for our existing prohibition is no longer valid, then it is our responsibility to examine ways to update and modernize the rules through an open and transparent rulemaking process." – Roger Sherman

http://www.fcc.gov/blog/fcc-and-inflight-mobile-wireless-services

Section 7

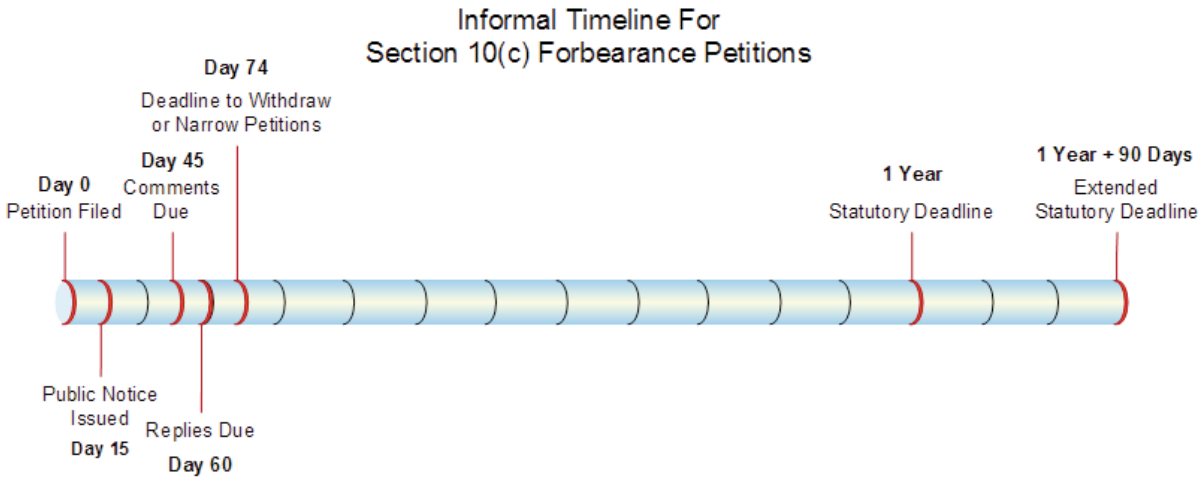
- 30th anniversary of passage was December 8!
- In those 30 years FCC has never found any technology to be "new technology"
- Recently told by a prominent spectrum attorney that he would not include Section 7 issue in a petition for a new technology because it would likely delay action!

#CommActUpdate

- Section 7 might benefit by inclusion in the Update that is now under consideration in House
  - Lack of action in 30 years shows likely problem with current terms
  - Present hard deadline maybe counterproductive
    - "New technology" needs clarification by FCC or Congress
  - Possible alternative:
    - Mandate FCC to prescribe rules and schedules for new technology deliberations
    - Improve transparency by mandating public tracking

Incremental §7 Reform

- Create a published timeline for new technology deliberations modeled after
  - Merger timeline: http://www.fcc.gov/encyclopedia/informal-timeline-consideration-applications-transfers-or-assignments-licenses-or-autho
  - §10(c) forebearance time line http://transition.fcc.gov/wcb/cpd/forbearance/timeline.html

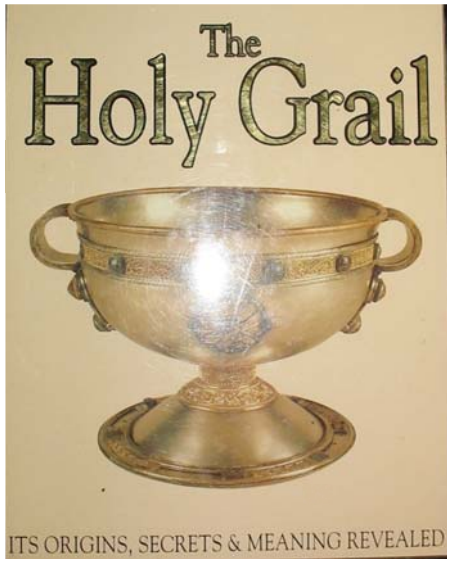


Resolve Docket 09-157

- Endless pendency of a proceeding on "wireless innovation" sends a very bad message about the Commission's interest
- §303(g):
  - "Study new uses for radio, provide for experimental uses of frequencies, and generally encourage the larger and more effective use of radio in the public interest;
  - Does not envision a patent office-like operation waiting for applications to appear on its door

AM Revitalization

- Why would anyone invest in updating AM technology given present regulatory uncertainties?
- While "anti-skywave antennas" would be the "holy grail" of new technology, last deliberation in 1980s lasted years
  - What information does FCC need to consider ASA?
  - What schedule will FCC use?
  - Is there light at the end of the tunnel?



PART 73—RADIO BROADCAST SERVICES

Contents

Subpart A—AM Broadcast Stations

"The 1920s called … they want their technical rules back"

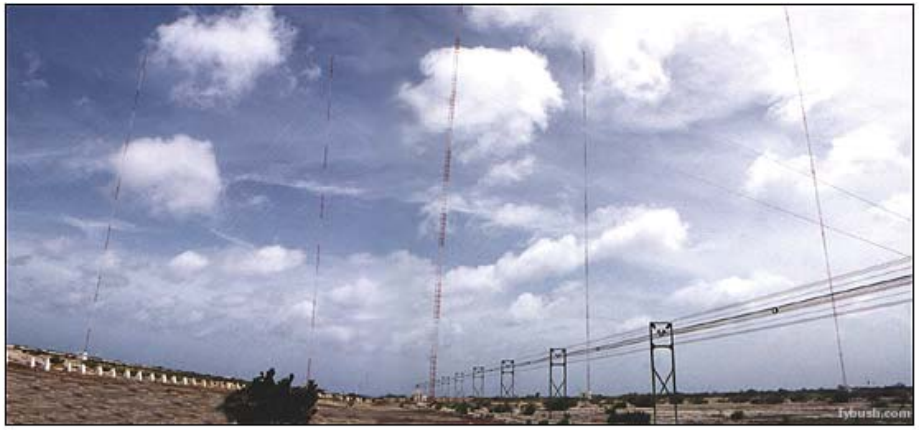
- Part 73, Subpart A contain AM technical rules
  - Much appears to predate creation of FCC in 1934
  - Other Title III technical rules now focus on outputs not inputs
  - 73/A is much more detailed than newer Title III tech rules and prescribes specific technology for transmitter rather than limiting impact on other stations as other radio service due
  - Regulates and requires equipment authorization for transmitter subsystems e.g. 73.68
- Suggest sunsetting
  - §73.51- Determining operating power
  - §73.53 - Requirements for authorization of antenna monitors
  - §73.57 - Remote reading antenna and common point ammeters
  - §73.58 - Indicating instruments
  - §73.62 - Antenna monitors
  - §73.68 - Sampling systems for antenna monitors
  - §73.69 - Antenna monitors

Radio Shack's Superbowl Ad:

"The 80s called …. they want their store back"

http://youtu.be/oUwwZHdx6SU

Permit Design Flexibility on Directional Antennas



AM parasitic array directional antenna of Trans World Radio in Bonaire. Implicitly forbidden by FCC for US broadcasters

- AM directional antennas have been around since the 1920s when analysis and monitoring techniques were more primitive
- Rule seem to mandate fixed pattern but in many cases changeable patterns are possible

Permit Design Flexibility on Directional Antennas

- Allowing changeable patterns would open door to near real time coverage negotiations between cochannel stations, similar to spectrum leasing
  - For stations near time zone boundary such negotiations could lead to more night time coverage as audience goes to sleep
  - Allow mutually agreed greater range for emergencies and special events
  - Focus on consent of affected parties

IEEE-USA §7/95+ GHz Petition

Docket 13-259

- Placed on public comment 4 months after filing
- No opposition received
- Foreign competitors work in “state capitalism” framework with gov’t funding of R&D and resulting regulatory freedom

FCC's War on Millimeterwave Technology

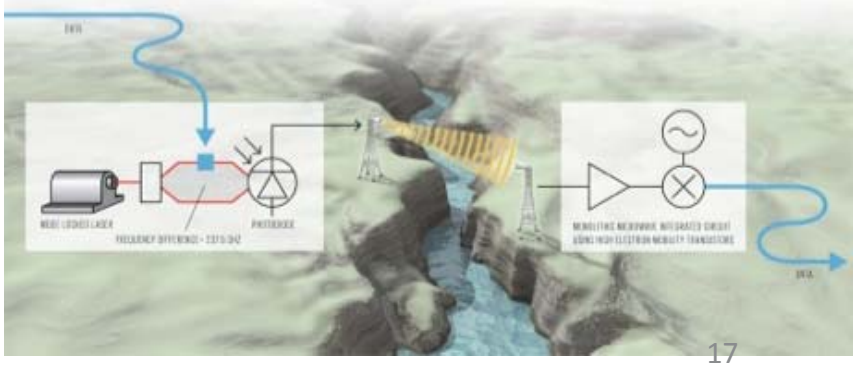
- FCC actions in 3 dockets create, probably unintentionally, a negative attitude for millimeterwave R&D:
  - Docket 10-236: Prohibits experimental licenses in passive bands regardless of threat to passive users
  - Docket 13-84 Proposes new RF safety standards but continues 100 GHz upper limit for explicit standards – continuing regulatory risk
  - Docket 13-259 – IEEE-USA petition

Overseas …

• Our foreign competitors continue advancements in mmW technology for commercial use

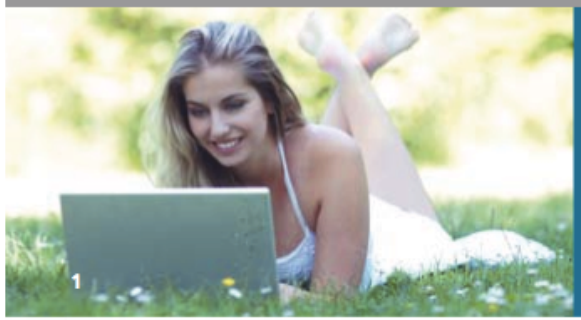
125 GHz system used at 2008 Beijing Olympics

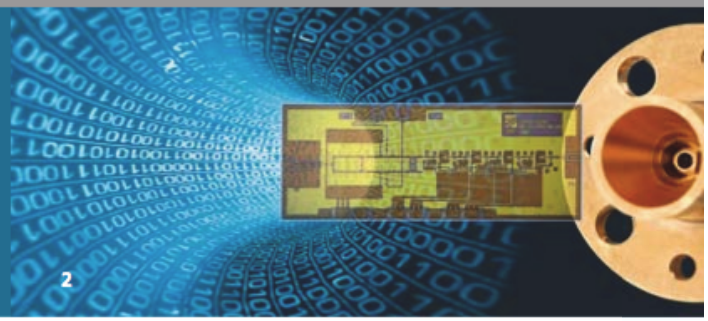
German/EU 237 GHz 100 Gb/s system



Probably an experiment not permitted under new Part 5 rules

FRAUNHOFER INSTITUTE FOR APPLIED SOLID STATE PHYSICS IAF





1 *High bit-rate data transmission using a radio link system.*
© MAST - Fotolia.com

2 *Receive MMIC fabricated in the Fraunhofer IAF 35 nm technology.*
© Fraunhofer IAF/Marek, Fotolia.com

TERAHERTZ-COMMUNICATION: MILLILINK

In close cooperation with the Karlsruhe Institute of Technology (KIT), Kathrein KG, Siemens AG and Radiometer Physics GmbH, Fraunhofer IAF has developed circuits operating in the high millimeter wave range in the scope of the project »Millilink « which is funded by the Federal Ministry of Education and Research (BMBF).

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Technology

- Multifunctional chips: Integration of mixer, amplifier and antenna
- Monolithic integrated circuits (MMICs)
- Use of the frequency range between 200 and 280 GHz

Applications

- Broadband access for rural areas
- Backhaul networks
- Last mile access
- Bit transparent wireless-wired interface
- Cost-efficient and flexible bridging of obstacles in urban areas

German gov't funding

Expected commercial applications

http://www.iaf.fraunhofer.de/content/dam/iaf/documents/komponenten/12_Produktblatt_Millilink_engl.pdf

KIT Karlsruhe Institute of Technology · KATHREIN Antennen · Electronic · Radiometer Physics GmbH · SIEMENS · GEFÖRDERT VOM Bundesministerium für Bildung und Forschung

Conclusions

- FCC should get out of the way of innovative technology and end the “war on millimeterwave technology”
- AM broadcasting regulation lives in a 1920s anachronism even as the industry suffers!